Neurologic disorders in Medicaid vs privately insured children and working-age adults

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Summary

This retrospective, observational study reports health utilization and access patterns of Medicaid recipients for neurologic diseases compared to privately insured individuals seen in 2 hospitals at a single institution in the same time period. We reviewed records of patients and compared demographic characteristics, visit types, neurologic diagnoses, and all-cause mortality, by age group, when seen with Medicaid vs private insurance. Adults insured by Medicaid were more likely to present as inpatients and with life-threatening neurologic disease compared to privately insured patients. Moreover, adult patients presenting with neurologic disease on Medicaid had a higher all-cause mortality rate than privately insured patients. Similar disparities in neurologic disease were not observed in children. The relationship of these findings to patient educational status, household income, comorbidities, and the reasons prompting Medicaid eligibility require additional study.

Nearly 60 million Americans are insured by Medicaid, the nation's largest health insurance program for people of limited income.¹ Covered groups include children, pregnant women, and individuals with disabilities. More than one-third of all births and more than one-half of people with AIDS in the United States are covered by Medicaid.¹ Since the economic crisis in the United States in 2008, the number

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Neuropathy and MS were more common in BC/BS patients and cerebrovascular diagnoses were more common in Medicaid enrollees.

of Medicaid enrollees increased by 7.5 million people.² The Affordable Care Act seeks to expand Medicaid eligibility and coverage in 2014, including a proposed expansion to all Americans under 65 years old with incomes at or below 133% of the federal poverty line. If fully implemented, 1 in every 5 Americans could be enrolled in Medicaid in the near future.³

Medicaid provides more limited reimbursement than most private insurers and may be associated with barriers to care that extend beyond financial reimbursement. Medicaid enrollees have been studied in the case of specific neurologic diseases. Where reported, neurologic patients with Medicaid insurance experience longer and more intensive hospital stays,^{4,5} reduced rates of prophylactic and new treatments,^{6,7} later age at diagnosis,⁸ fewer referrals to inpatient rehabilitative services,⁹ and worse clinical outcomes^{10,11} than the privately insured. However, most neurologic diseases have been studied in a limited way or observed over a short time period, often in better financial times. There are few available data on Medicaid-enrolled patients experiencing neurologic disease in spite of the high number of Medicaid-insured patients that exist nationally.

A study of Medicaid-insured patients with neurologic diagnoses at a large, academic institution that simultaneously provides care to a high number of well-insured private health insurance recipients may provide insight into the few reports available on a disease-specific basis. We performed an observational study of 2 large US hospitals with neurology departments, comparing Medicaid-insured patients with those covered by the private insurer Blue Cross/Blue Shield (BC/BS). We analyzed children and working-age adults for neurologic health services utilization, diagnoses, and mortality to discern whether important differences exist between groups.

METHODS

Source population and setting

This study was approved by The Johns Hopkins University Institutional Review Board. All billing records of the Departments of Neurology at the Johns Hopkins Hospital and Bayview Medical Center Hospital, 2 stand-alone referral hospitals in Baltimore, Maryland, were searched for outpatient and inpatient encounters (June 1, 2006–May 31, 2013). The Johns Hopkins Medical Institution is a quaternary referral center with patient access through the emergency department; internal referrals by physicians and allied health care providers to general neurology and subspecialty clinics; and general neurology and subspecialty referrals by external physicians, allied health care providers, and patients. The Johns Hopkins Hospital has 66 acute care neurology beds and 20 neurologic intensive care unit beds, an epilepsy center, and a trauma center. The Bayview Medical Center Hospital includes 8 neurologic intensive care unit beds, 6 intermediate care beds, and 17 acute care neurology beds. The decision to see patients in the outpatient neurology clinic and the time of visit is made by the individual neurologist. Patients less than 65 years old at the time of the clinical encounter were included and categorized as either Medicaid- or BC/BS-covered at the time of the visit for neurologic disease. Patients from any state and the District of Columbia were included.

Eligibility for Medicaid is determined by low income and membership in categorically defined groups deemed eligible for public support. Certain groups have “mandatory eligibility” by federal law and other groups are given “optional eligibility” at the discretion of individual states. All Medicaid recipients are US citizens. In 2009, the most recently available reporting year, an estimated 960,915 individuals were enrolled in Medicaid in Maryland, with approximately \$3.8 billion USD paid by the federal government and approximately \$2.5 billion

USD paid by the state government.¹ Children in this study may have received coverage under the state-sponsored Children's Health Insurance Program.

BC/BS is one of the United States' largest private insurance providers and covers an estimated 100 million people nationally,¹² including employer-sponsored health programs. Patients receiving BC/BS were considered private, well-insured patients in this study. Patients with any other type of insurance coverage were excluded. Uninsured patients were not included due to a lack of information on whether an individual chose to pay privately or was unable to acquire medical insurance.

Variables of interest

Variables of interest included age at presentation, sex, race (black, white, all others), inpatient vs outpatient visit, *ICD-9* diagnostic code¹³ specified to the first 3 digits, and mortality status (defined as a date of death on or before May 31, 2013). Age groups were categorized as <13.0 years old, 13.0–17.9 years old, and 18.0–64.9 years old. These age groups were chosen to reflect legal definitions of children vs adults and among children, different epochs of life that would still permit adequate numbers of patients in each group.

Among adults, 5 severe, emergent, or critical neurologic illnesses; 6 chronic, usually non-emergent neurologic diagnoses; and 1 diagnosis that could be made during inpatient or outpatient visits were preselected for comparison between insurance groups. These diagnoses included meningitis, encephalitis, intracerebral hemorrhage, hypoxic ischemic encephalopathy, and epilepsy (inpatient visits only) in the first category; carpal tunnel syndrome, Parkinson disease, migraine, pain (as found anywhere in the *ICD-9* code), multiple sclerosis, and epilepsy (outpatient visits only) in the second category; and transient cerebral ischemia in the third category. In the case of epilepsy and pain diagnoses, all *ICD-9* codes with the term "epilepsy" and "pain" were respectively combined. Both primary diagnoses and secondary diagnoses of interest were included. Death information was taken from the medical records system.

Statistical analysis

Basic descriptive statistics were tabulated by insurance group. Confidence intervals (CIs) for proportions were constructed using the score interval and the Yates continuity correction. Marginal odds ratios (ORs) were estimated by sample ORs. Estimates of age-, sex-, and race-adjusted ORs were obtained from a multivariable logistic regression of disease prevalence on age (continuous), sex (binary), race (binary: white or nonwhite), and insurance type (binary: BC/BS or Medicaid). The Wald statistic based on this model was used to evaluate the null hypothesis of equal disease prevalence across insurance groups adjusting for age, sex, and race. CIs for ORs were constructed using the asymptotic normality of the estimated model coefficients and model-based estimates of their standard error.

Associations between categorical outcomes and insurance type were adjudicated using Pearson χ^2 test. Because patients at times contribute more than 1 visit each, visit-level data are possibly clustered. The proportion of inpatient visits in different insurance groups (BC/BS or Medicaid) was studied using a univariable logistic model fitted using generalized estimating equations; this allowed proper accounting of the potential clustering.¹⁴

Service dates were dichotomized as occurring before or after November 30, 2009, and a multivariable logistic model including insurance status dichotomized by service date and the interaction between these 2 was used to assess the existence of a time trend in the relative proportion of inpatient visits in the 2 insurance groups. Again, generalized estimating equations were employed to fit this model while accounting for clustering between visits. CIs for proportions of inpatient visits in different insurance groups and periods were constructed based on the asymptotic normality of the estimated model coefficients and using robust estimates of their variance-covariance matrix. All tests of hypothesis were 2-sided and conducted at significance level 0.05. The effect of multiple testing in assessing the association between various conditions and insurance type was corrected using Holm method.¹⁵ Incomplete mortality information

In adults, cerebrovascular diagnoses represented 2 of the 5 most common neurologic diagnoses among Medicaid recipients but none of the top 5 diagnoses among BC/BS patients.

was assumed to be missing completely at random. All analyses were conducted using *R* (*R* for Mac OS X GUI 1.35, R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

There were 3,374 patients, including 1,993 Medicaid enrollees and 1,381 BC/BS-covered patients (table 1). The race distribution of patients receiving Medicaid vs BC/BS insurance was significantly different between insurance types in all age groups. BC/BS recipients of neurologic care were significantly more often female in the adult age group with no difference in sex between insurance types observed in children. More Medicaid-insured than BC/BS patients were seen at this institution.

There were 8,998 visits for neurologic diagnoses including 5,660 for Medicaid-insured patients and 3,338 for BC/BS-insured patients. Although outpatient visits predominated in each insurance group, the distribution of outpatient vs inpatient visits for neurologic diagnoses differed substantially depending on insurance status ($p < 0.001$). Among Medicaid-insured patients, 2,625 visits (46.4%, 95% CI 45.1–47.7) were inpatient, compared to 532 visits (15.9%, 95% CI 14.9–17.1) among BC/BS patients. The overrepresentation of inpatient visits among Medicaid patients relative to BC/BS patients was far greater after November 30, 2009 ($p < 0.001$). Before this date, 42.8% (95% CI 41.1–44.5) and 18.4% (95% CI 17.1–19.8) of visits by Medicaid and BC/BS patients, respectively, were inpatient. The corresponding percentages after this date were 49.4% (95% CI 47.8–50.9) and 6.7% (95% CI 5.6–8.0), respectively.

Children

The most common neurologic diagnoses among children were not different between Medicaid and BC/BS groups in this study (table 2). There were also no significant differences in the number of deceased children by insurance status in any age group.

Working-age adults

Medicaid patients were younger at the time of first neurologic visit to this institution than BC/BS patients ($p < 0.001$). Survival information was available for 2,336 adult patients (69.2%) at the time of medical records search. A higher proportion of Medicaid patients with neurologic diagnoses was observed to have died from any cause (8.1% vs 3.5%, $p < 0.001$). The most common neurologic diagnoses were different between Medicaid and BC/BS patients with chronic neurologic diseases. Neuropathy and MS were more common in BC/BS patients and cerebrovascular diagnoses were more common in Medicaid enrollees (table 2).

Prespecified neurologic diagnoses of interest in working-age adults are presented in table 3. After adjustment for baseline differences in age, sex, and race, and correction for multiple comparisons, intracerebral hemorrhage and transient cerebral ischemia were significantly more prevalent among Medicaid-insured patients, while migraine and MS were significantly more common in BC/BS patients.

DISCUSSION

Medicaid was enacted in 1965 in the United States, and, in 2002, it became the nation's largest program for health insurance.¹⁶ This study demonstrates the health utilization and access

Table 1 Demographic characteristics of patients on Blue Cross/Blue Shield and Medicaid by age group

	BC/BS	Medicaid	p Value	Total
Age <13 y				
Total number of individuals	60	398	—	458
Number of female participants	26/60	173/398	0.999	199/458
Percent	43.3	43.5		43.4
95% CI	(30.8, 56.7)	(38.6, 48.5)		(38.9, 48.1)
Race (white, black, other or unknown)	45, 10, 5	137, 181, 80	<0.001	182, 191, 85
Percent	75.0, 16.7, 8.3	34.4, 45.5, 20.1		39.7, 41.7, 18.6
Number deceased	3/30	33/288	0.999	36/318
Percent	10.0	11.5		11.3
95% CI	(2.6, 27.7)	(8.1, 15.8)		(8.2, 15.5)
Age 13–17 y				
Total number of individuals	59	168	—	227
Number of female participants	25/59	66/168	0.793	91/227
Percent	42.4	39.3		40.1
95% CI	(29.8, 55.9)	(31.9, 47.1)		(33.7, 46.8)
Race (white, black, other or unknown)	39, 17, 3	61, 85, 22	<0.001	100, 102, 25
Percent	66.1, 28.8, 5.1	36.3, 50.6, 13.1		44.1, 44.9, 11.0
Number deceased	2/26	5/99	0.966	7/125
Percent	7.7	5.1		5.6
95% CI	(1.3, 2.7)	(1.9, 11.9)		(2.5, 11.6)
Age 18–64 y				
Total number of individuals	1,262	1,427	—	2,689
Average age at first visit, y	46.8	42.1	<0.001	44.3
95% CI	(46.1, 47.6)	(41.4, 42.8)		(43.8, 44.9)
Number of female participants	805/1,262	691/1,427	<0.001	1,496/2,689
Percent	63.8	48.4		55.6
95% CI	(61.1, 66.4)	(45.8, 51.1)		(53.7, 57.5)
Race (white, black, other or unknown)	863, 297, 102	574, 745, 108	<0.001	1,437, 1,042, 210
Percent	68.4, 23.5, 8.1	40.2, 52.2, 7.6		53.4, 38.8, 7.8
Number deceased	27/776	90/1,117	<0.001	117/1,893
Percent	3.5	8.1		6.2
95% CI	(2.3, 5.1)	(6.6, 9.8)		(5.2, 7.4)

Abbreviations: BC/BS = Blue Cross/Blue Shield, CI = confidence interval.

patterns of a large number of Medicaid recipients for neurologic diseases compared to privately insured individuals seen in 2 hospitals at a single institution in the same time period. Adults receiving Medicaid vs BC/BS insurance had important differences in neurologic diagnoses after adjustment for race, age, and sex differences. Privately insured patients were more likely to be seen for chronic, less urgent neurologic diagnoses such as unspecified peripheral neuropathy and MS. Meanwhile, Medicaid recipients were most commonly seen

Table 2 Most common neurologic diagnoses for patients seen in the Department of Neurology by age group and insurance status

	BC/BS	Medicaid
Age <13 y (n = 458)	(1) 345 epilepsy (n = 42)	(1) 345 epilepsy (n = 238)
	(2) 346 migraine (n = 6)	(2) 348 other conditions of the brain (n = 73) ^a
	(3) 780 general symptoms (n = 3) ^b	(3) 783 symptoms concerning nutrition metabolism and development (n = 71) ^c
	(4) 783 symptoms concerning nutrition metabolism and development (n = 3) ^d	
Age 13–17 y (n = 227)	(1) 345 epilepsy and recurrent seizures (n = 21)	(1) 345 epilepsy and recurrent seizures (n = 85)
	(2) 346 migraine (n = 18)	(2) 343 infantile cerebral palsy (n = 24)
	(3) 781 symptoms involving nervous and musculoskeletal systems (n = 6) ^e	(3) 359 muscular dystrophies and other myopathies (n = 17)
		(4) 346 migraine (n = 17)
Age 18–64 y (n = 2,689)	(1) 346 migraine (n = 246)	(1) 345 epilepsy and recurrent seizures (n = 297)
	(2) 345 epilepsy and recurrent seizures (n = 206)	(2) 434 occlusion of cerebral arteries (n = 195)
	(3) 340 MS (n = 150)	(3) 348 other conditions of the brain (n = 168) ^f
	(4) 354 mononeuritis of upper limb and mononeuritis multiplex (n = 118)	(4) 436 acute, but ill-defined, cerebrovascular disease (n = 119)
	(5) 356 hereditary and idiopathic peripheral neuropathy (n = 117)	(5) 780 general symptoms (n = 119) ^g
		(6) 346 migraine (n = 99)

Abbreviations: BC/BS = Blue Cross/Blue Shield; MS = multiple sclerosis.

^aIncludes encephalopathy unspecified, anoxic encephalopathy, compression of the brain.

^bIncludes febrile convulsions and other convulsions.

^cIncludes unspecified lack of physiologic development delayed milestones.

^dIncludes delayed milestones and unspecified lack of normal physiologic development.

^eIncludes abnormal involuntary movements.

^fIncludes encephalopathy unspecified, idiopathic intracranial hypertension, and anoxic encephalopathy.

^gIncludes other convulsions transient alteration of awareness and dizziness and giddiness.

for convulsions and cerebrovascular diseases and, in total, represented a larger group of adult patients seen at this institution. In adults, cerebrovascular diagnoses represented 2 of the 5 most common neurologic diagnoses among Medicaid recipients but none of the top 5 diagnoses among BC/BS patients. Overall, nearly half of Medicaid patients were seen as inpatients compared to approximately one-sixth of BC/BS-insured patients. These findings suggest differences in patterns of neurologic presentation and care that require further examination for causal associations and generalizability.

Differences in patterns of neurologic care by insurance status may be explained by variations in baseline biological and socioeconomic risk factors, health care-seeking behaviors, access and uptake of neurologic care, and/or institutional and provider biases in care provision. Overall, patients with Medicaid insurance are more likely than the average population to be of low income, chronically ill, or institutionalized, or to experience mental illness, drug abuse, and alcoholism.^{17,18} These factors may directly relate to poverty, changing the biological risk profile for neurologic disease. Differences in physical activity¹⁹ and diabetes mellitus²⁰ have been reported in the case of stroke. Among patients with primary malignant brain tumors, the age at onset was younger in Medicaid vs privately insured patients, which may partially represent baseline risk.²¹

Table 3 Relationship between patient insurance status and 12 preselected neurologic diagnoses among working-age adults

Diagnosis	BC/BS (out of 1,262 patients), n (%) (95% CI)	Medicaid (out of 1,427 patients), n (%) (95% CI)	Estimated OR (marginal), (95% CI)	
Predominantly inpatient diagnoses				
Meningitis	15 (1.2) (0.7, 2.0)	44 (3.1) (2.3, 4.2)	0.38 (0.21, 0.68)	
Encephalitis	25 (2.0) (1.3, 3.0)	25 (1.8) (1.2, 2.6)	1.13 (0.65, 1.98)	
Intracerebral hemorrhage	15 (1.2) (0.7, 2.0)	90 (6.3) (5.1, 7.7)	0.18 (0.10, 0.31)	
Hypoxic-ischemic encephalopathy	3 (0.2) (0.1, 0.8)	19 (1.3) (0.8, 2.1)	0.18 (0.05, 0.60)	
Epilepsy (inpatient)	32 (2.5) (1.8, 3.6)	73 (5.1) (4.1, 6.4)	0.52 (0.32, 0.82)	
Predominantly outpatient diagnoses				
Parkinson disease	13 (1.0) (0.6, 1.8)	11 (0.8) (0.4, 1.4)	1.34 (0.60, 3.00)	
Epilepsy (outpatient)	190 (15.1) (13.2, 17.2)	239 (16.7) (14.9, 18.8)	0.92 (0.74, 1.13)	
Multiple sclerosis	150 (11.9) (10.2, 13.8)	60 (4.2) (3.2, 5.4)	3.07 (2.25, 4.19)	
Carpal tunnel syndrome	48 (3.8) (2.8, 5.1)	56 (3.9) (3.0, 5.1)	0.97 (0.65, 1.43)	
Migraine	246 (19.5) (17.4, 21.8)	99 (6.9) (5.7, 8.4)	3.25 (2.54, 4.16)	
Pain	20 (1.6) (1.0, 2.5)	23 (1.6) (1.0, 2.5)	0.98 (0.54, 1.80)	
Either inpatient or outpatient diagnoses				
Transient cerebral ischemia	21 (1.7) (1.1, 2.6)	43 (3.0) (2.2, 4.1)	0.54 (0.32, 0.92)	
Diagnosis	p Value (marginal)	Estimated OR (multivariable regression) (95% CI)	p Value (multivariable regression)	Adjusted p (multivariable regression)
Predominantly inpatient diagnoses				
Meningitis	0.001	0.51 (0.27, 0.95)	0.033	0.229
Encephalitis	0.661	1.25 (0.68, 2.28)	0.473	0.999
Intracerebral hemorrhage	<0.001	0.20 (0.11, 0.35)	<0.001	<0.001
Hypoxic-ischemic encephalopathy	0.005	0.22 (0.06, 0.78)	0.019	0.149
Epilepsy (inpatient)	0.005	0.70 (0.43, 1.15)	0.160	0.961
Predominantly outpatient diagnoses				
Parkinson disease	0.477	0.76 (0.32, 1.77)	0.519	0.999
Epilepsy (outpatient)	0.416	1.15 (0.91, 1.46)	0.250	0.999
Multiple sclerosis	<0.001	2.67 (1.92, 3.71)	<0.001	<0.001
Carpal tunnel syndrome	0.871	0.85 (0.56, 1.29)	0.439	0.999
Migraine	<0.001	3.38 (2.58, 4.43)	<0.001	<0.001
Pain	0.956	1.09 (0.57, 2.08)	0.800	0.999
Either inpatient or outpatient diagnoses				
Transient cerebral ischemia	0.024	0.44 (0.25, 0.77)	0.004	0.037
Abbreviations: BC/BS = Blue Cross/Blue Shield; OR = odds ratio.				

Abbreviations: BC/BS = Blue Cross/Blue Shield; OR = odds ratio.

Health care seeking for neurologic disease has not been well-studied. The underlying motivation to present with symptoms of neurologic disease may differ in Medicaid vs privately insured groups due to differences in educational level, exposure to advertising, access to adequate transportation, or ability to navigate complex medical appointment systems. People with lower income may not seek care for some neurologic symptoms, such as symptoms related to

peripheral neuropathy. If the underlying disease or diseases remain untreated, morbidity and disability may accrue, creating eligibility for Medicaid.

Although this study did not evaluate causes for the discrepancies found, previous studies have reported disparities among Medicaid recipients with neurologic disease that cannot be readily explained by baseline risk factors or care seeking patterns alone. In a report of actors posing as mothers of pediatric patients with common childhood diseases—including a proposed 8-year-old with new-onset afebrile seizures seen in an emergency department in the previous week in Cook County, Illinois—66% of children on Medicaid were denied an outpatient follow-up appointment compared to 11% of BC/BS-insured patients (relative risk 6.2, 95% CI 4.3–8.8). Waiting time also differed among neurology clinics that accepted both insurance types, with an estimated difference of 15.5 ± 63.5 weeks.²² A separate study of the use of lobectomy for epilepsy surgery, using the United States Nationwide Inpatient Sample, found that privately insured adults were more likely to receive surgery, consistent with Class I evidence and practice guidelines, than Medicaid or Medicare enrollees (relative risk 1.28, 95% CI 1.25–1.30).⁷ Medicaid patients were less likely than privately insured patients to receive abortive (OR 1.6, 95% CI 1.1–2.3) and prophylactic therapy (OR 1.5, 95% CI 1.0–2.1) for migraine headaches in a national study of more than 68 million visits for migraine.⁶ By contrast, a study of the Medical Expenditure Panel Survey using the National Health Interview Survey found people with epilepsy had similar medical resource utilization but lower out-of-pocket costs for antiepileptic drugs compared to those with private insurance.²³ Poststroke care may also differ between Medicaid and privately insured neurologic patients.^{9,10}

This retrospective, observational study of a large group of neurologic patients had multiple strengths. The long time period of observation, spanning seven years and inclusion of all neurologic diseases by 2 large neurology departments provides insight into large groups of privately vs Medicaid insured patients. Unlike the Nationwide Inpatient Sample, which is used for multiple studies of insurance status, this report includes outpatient and inpatient visits and is able to provide insight into the types of neurologic visits by insurance status. It also provides an assessment of mortality by insurance status in various age groups, adjusted for recognized differences in baseline risk for neurologic diseases that may otherwise confound results. Our study does not suffer from recall bias since diagnoses were made at the time of presentation and recorded in a centralized billing database. It is expected that all neurologic diagnoses were captured in this time period at this institution.

Our study has multiple limitations. This is a single institution study. It is unknown whether the results can be generalized to other hospitals, locations, or other major US academic institutions that have differing policies towards patients with various insurance types. The inner-city Baltimore population may have a disproportionate number of patients with substance abuse and low income compared to other US locations. Given the large number of individuals in this study, it was not possible to review each file and *ICD-9* diagnosis for accuracy, even though each neurologic diagnosis was made or verified by a neurologist at the time of diagnosis. Individuated risk factor assessments would provide deeper insights into whether disparities between groups could be accounted for by biological risk factors, acquired risk factors, socioeconomic circumstances, or barriers within the health system. In particular, comorbidity indices that predict mortality such as the Charlson, Quan, or Elixhauser scores were not possible to determine given that patients may seek health care from different sources and each chart could not be reviewed in detail. The Andersen and Newman model²⁴ for health care utilization also delineates more than 20 individual-level factors that may prompt a health visit, most of which could not be studied here. It is expected that Medicaid-insured patients would be sicker overall than patients with private insurance. This is due to the very nature of enrollment into these programs and cannot be fully attributed to behaviors of or responses to Medicaid patients. It would be valuable to consider patients by subgroups that represented primary reasons for Medicaid enrolment (e.g., disability, poverty, HIV), but in practice, this information was not available. It would also be valuable to cross-reference hospital records in

this study with the US National Death Index to assure the most accurate and updated details on mortality. However, this process is costly and hospital records were used instead.

Nonetheless, it must be noted that the wide differences seen in some aspects of care require further attention. One example of this is the case of MS. A previous study using insurance billing data from 6 states demonstrated that the prevalence of MS is higher in the disabled Medicaid (71 per 10,000) vs the privately insured populations (24 per 10,000) in the United States.²⁵

Medicaid has the potential for wide expansion in the near future to include the uninsured. Medicaid as a replacement for no insurance, the counterfactual situation for most Medicaid recipients, is associated with reduced mortality, improved access to care, and better self-reported health.^{26,27} The expansion of Medicaid will likely include an adult population that is generally healthier than the existing Medicaid population. Yet one-third of physicians stated they would refuse Medicaid patients in a recent survey.²⁸

The diversity of insurance types in the United States provides the opportunity to understand the effect of government health policy on neurologic care provision. Further work could help address what appear to be potentially important differences in the diagnoses and outcomes of privately insured vs Medicaid-insured neurologic patients. It is unlikely that biological differences alone can account for these differences, making health policy measures paramount in addressing the high burden of neurologic disease in the United States.

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